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II. *A Continuation of Mr John Clayton's Account of Virginia.*

Vid. *Philos.*
Transact.
Numb. 201.

Of the EARTH and SOYL.

When you make the Capes of *Virginia*, you may observe it low Land, so that at some distance the Trees appear as if they grew in the Water; and as you approach nigher, to emerge thence. For a hundred Miles up into the Country, there are few Stones to be found, only in some places, Rocks of Iron Oar appear, which made me expect to have found many Waters turn Purple with Galls, but never met with any. Providence has supplied the common use of Stones, by making the Roads very good: so that they ride their Horses without shoeing them; which yet are more rarely beaten on their Feet, than ours are in *England*, the Country and Clime being dry, their Hoofs are much harder: for I observed, that take a Horse out of the wet Marishes, and Swamps, as they there call them, and ride him immediately, and he'll quickly be tender-footed. In some places, for several Miles together, the Earth is so intermix'd with Oyfter-shells, that there may seem as many Shells as Earth; and how deep they lie thus intermingled, I think, is not yet known: for at broken Banks they discover themselves to be continued many Yards perpendicular. In several places these Shells are much closer, and being petrefied, seem to make a Vein of a Rock. I have seen in several places, Veins of these Rocky Shells, three or four Yards thick, at the foot of a Hill, whose Precipice might be twenty Yards perpendicular, whose Delf, I suppose, shot under the Hill, pieces of these Rocks broken off, lie there, which, I suppose, may weigh twenty or thirty Tuns a piece, and are as

difficult to be broken as our Free-stone. Of these Rocks of Oyster-shells that are not so much petrefied, they burn and make all their Lime; whereof they have that store, that no Generation will consume. Whether these were formerly Oysters, which left by the subsiding Seas, (as some suppose, that all that Tract of Land, now high Ground, was once overflowed by the Sea) were since petrefied, or truly Stones, *sui Generis*, I leave to the Honourable Society to determine. But when I consider the constant and distinct shooting of several Salts, Nature's Curiosity, in every thing, so far exceeding that of Art, that the most Ingenious, when referr'd thereto, seem only endued with an Apish fondness, I cannot think any thing too difficult or wonderful for Nature; and indeed, I do not apprehend, why it may not be as feasible to suppose them to have been Rocks, at first shot into those Figures, as to conceive the Sea to have amass'd such a vast Number of Oyster-shells one upon another, and afterwards subsiding, should leave them cover'd with such Mountains of Earth, under which they should petrefie: But not to launch forth too far into those Disputes, since I must modestly remember to whom I write. Often, in the looser Banks of Shells and Earth, are found perfect Teeth petrefied, some whereof I have seen, could not be less than two or three Inches long, and above an Inch broad: Tho' they were not Maxillary Teeth, the part that one might suppose grew out of the Jaw, was polish'd, and black, almost as Jett; the part which had been fasten'd in the Jaw and Gums, was brown, and not so shiningly polish'd, or smooth; if they were, as they seem'd to be, really Teeth, I suppose, they must have been of Fishes. The Back-bone of a Whale, and as I remember, they told me of some of the Ribs, were digg'd out of the side of a Hill, several Yards deep in the Ground, about four Miles distant from *James-Town*, and the River. Mr. *Banister*, a Gentleman pretty curi-

ous in those things, shew'd me likewise the Joynt of a Whale's Back-bone, and several Teeth, some whereof, he said, were found in Hills beyond the Falls of *James River*, at least, a Hundred and fifty Miles up into the Country. The Soyl in general is sandy : I had designed, and I think it might be worth a Critical Remark, to observe, the Difference of Soyls seem appropriated to the several sorts of Tobacco : for there is not only the two distinct sorts of a Sweet-scented, and Aranoko Tobacco, but of each of these be several sorts much different, the Seeds whereof are known by distinct Names, they having given them the Names of those Gentlemen most famed for such sort of Tobacco, as of *Prior-seed*, &c. Nay, the same sort of Seed in different Earths, will produce Tobacco much different, as to goodness. The richer the Ground, the better it is for Aranoko Tobacco, whose Scent is not much minded, their only aim being to have it specious, large, and to procure it a bright Kite's-foot colour. Had not my Microscopes, &c. Tools to grind Glasses, been cast away, with my other things, I had made some Critical Enquiries into their several Natures, I would have examin'd what Proportions of Salts, all the sorts of Earths had afforded, and how Water impregnated with their Salts, would have changed with infusing Galls, how with the Syrup of Violets, and how they would have precipitated Mercury, or the like, and so far forth as I had been able, examined them by the several Tryals of Fire. I conceive Tobacco to be a Plant abounding with Nitro-Sulphurous Particles ; for the Planters try the goodness of their Seed, by casting a little thereof into the Fire ; if it be good, it will sparkle after the manner of Gunpowder : so will the Stalks of Tobacco-leaves, and perhaps has something analogous to the Narcotick Sulphur of *Venus*, which the Chymists so industriously labour after. The World knows little of the efficacy of its Oyl, which has wonderful Effects in the

curing of old inveterate Sores, and Scrophulous Swellings, and some, otherwise applied and qualified. The goodness of Tobacco I look on primarily consists in the volatility of its Nitre : And hence the sandy Grounds that are most impregnated therewith, and whose Nitrous Salt is most volatile, for such Grounds are quickest spent, yield Tobacco's that have the richest Scent, and that shortly becomes a pleasant Smoak ; whereas, in Tobacco that grows on stiff Ground, the Salts seem more fix'd, and lock'd up in the Oyl, so that whilst new, 'tis very heady and strong, and requires some time for its Salts to free themselves, and become volatile ; which it manifests, by its having an Urinous Smell. The same Reason satisfies, why Tobacco that grows on low Lands as far as the Salts, tho' the Plant be never overflowed with Salt Water, yet the Ground that feeds the Plant being impregnated with Salt Water, that Tobacco smoaks not pleasantly, and will scarcely keep Fire, but do all that a Man can, will oft go out, and gives much trouble in frequent lighting the Pipe, 'till after it has been kept some considerable time : which may be assign'd to the fixeder Saline Particles of the Marine Salt in these Plants, which require more time e're they be render'd volatile. Here it might be worthy an Enquiry into the Nature of Filtration of Plants, since we may hence gather, Particles of the Marine Salt are carried along with the *Succus Nutritius* of the Plant ; concerning which, if it were not too much to deviate from the Matter in hand, I should offer some Reflections of my own, which the Learned Society might perhaps improve : for I think thence might be made many happy Conjectures as to the Virtues of Plants. So where we see Plants, or Trees, of an open Pore growing low, we shall find their Juice has subtiler parts : So have all Vines, whether the Grape Vine, or Briony, or a Smilax, or the like. If a Gummos Plant or Tree, that grows low, and close pored,

pored, it abounds with acid Spirits, as *Lignum Vitæ*, &c. if it grow tall, and be open pored, it abounds with a subtil volatile Spirit, as your Firrs, and the Turpentine Tree. But to insist no further herein, than as this may be applicable to the present Discourse: for I have observed, that that which is called Pine-wood Land, tho' it be a sandy Soyl, even the Sweet-scented Tobacco that grows thereon, being large and porous, agreeable to Aranoko Tobacco; it smoaks as courly as Aranoko: wherefore 'tis, that I believe the Microscope might make notable Discoveries towards the knowledge of good Tobacco: for the closer the Composition of the Leaf, the better the Tobacco; and therefore the Planters and Merchants brag of the Substance of their Tobacco; which word, did they always take it in a true sence, for the Solidness, and not mistake it for the Thickness, it would be more consonant to a true Observation: for as I said of the Pine-wood Tobacco, some of it is thick and not solid, and differs from the best Tobacco, as Buff does from Tann'd Leather; so that if the Tobacco be sound and not rotten, you may give a great guess at the goodness of Tobacco, when you weigh the Hogsheads, before you see them: for if an equal care be taken in the Packing of them, the best Tobacco will weigh the heaviest, and pack the closest. Now I said, that the Sweet-scented Tobacco most in vogue, which was most famed for its Scent, was that that grew on sandy Land; which is true, if you would smook it whilst new, or whilst only two or three Years old; but if you keep the stiff Land Tobacco, which is generally a Tobacco of great Substance five or six Years, it will much excel: for tho' the sandy Land Tobacco abound with a volatile Nitre at first, yet the stiff Land Tobacco abounds with a greater quantity of Nitre, only that it is lock'd up in its Oyl at first, and requires more time to extricate itself, and become volatile; but the Pine-wood Land having little of the Nitro-

Sulphurous

Sulphurious Particles, neither is, nor ever will make any thing of a rich Smoak. Discoursing hereof some days since, to a Gentleman of good Observation, that has been versed with Maulting, he assured me, to back this my Supposition, or Hypothesis, he had observed, That Barly that grew on stiff Ground, required more time considerably to mellow, and come to perfection, than that that grew in light Land. Having proceeded thus far to speak of Tobacco, I shall add one or two things more. The Planters differ in their Judgments about the Time of Planting, or Pitching their Crops: some are for Pitching their Crops very early, others late, without any distinction of the Nature of the Soyls; and 'tis from the different Effects that they find, in that, sometimes early, sometimes the late Planting succeeds: but they have not the Reason to judge of the Cause, to consider the Accidents of the Year, and the Difference of the Soyls. In sandy Grounds they need not strive so much for early Planting, the looseness of the Earth, and the kind natured Soyl, yielding all that it can, easily and speedily, and Sand retaining the heat, makes the Plants grow faster. But in stiff Soyls, if the Crops be not early pitch'd, so that during the Season of Rains it have got considerable Roots, and shot them some depth, if early Droughts come, it so binds the Land, that the Roots never spread or shoot deeper, or further than the Hill that they are planted in: for they plant them as we do Cabbages, raising Hills to set every Plant in, about the bigness of a common Mole-hill: observing this on the Plantation where I lived, that it was stiff Ground, I advised them to plant their Crops as early as possible; and in order thereunto, I tried several ways to further the Plants; but not to trouble you with the several Experiments that I made, in reference thereto: What I found most advantageous was, by taking an infusion of Horse-dung, and putting thereon Soor, and then my Seeds; this I kept

Forty eight Hours in an ordinary digestive heat, I had two Beds left me to Sow, in the midst of those the People sow'd, and the quantity of Seed that they generally allotted to the same quantity of Ground ; when I sow'd, I mix'd Ashes with the Seed, having decanted the Liquor, that the Seed might sow the evenner : the effect was, that my Plants came up much sooner, grew swifter, and I had five Plants for one more than any of the other Beds bore ; I left the Country shortly after, and so had no certainty of the final Result. There be various Accidents and Distempers, whereunto Tobacco is liable, as the Worm, the Flie, Firing to Turn, as they call them, French-men, and the like. I propos'd several ways to kill the Worm and Flie, as by Sulphur and the like ; but had no opportunity to experiment it : I shall set down that I had most hopes of, which perhaps may give a hint to others to try or improve : Tobacco-seed is very small, and by consequence so is the young Plant at first, that if gleamy Weather happen at that time, it breeds a small Flie, which consumes the Plume of the Plant ; now it being early in the Year when they Sow the Seed, *viz.* about the 14th of *January*, they cover the Ground, to secure, as well as they can, their tender Plants, from the nipping Frosts, that may happen in the Nights ; they cover them only with a few Oak-leaves, or the like ; for Straw they find apt to harbour and breed this Flie : I therefore would advise them to smoak Straw with Brimstone, once in two or three Nights, and so they might cover them securely, with that which would preserve them infinitely beyond the Covering with Oak-boughs ; indeed, I would advise them to keep peculiarly so much of their *Indian* Corn-blades, which they gather for their Fodder, for this very purpose, being, as I conceive, much the best, there being no Chaff to foul their Beds, and prejudice them when they should weed them. What they call Firing is this : When Plants are of small Substance,

as when there has been a very wet and cold Season, and very hot Weather suddenly ensues, the Leaves turn brown, and dry to dust; the Cause I conceive to be hence: The Plant being feeble, and having a small quantity of Oyl, which makes the more solid part of the Plant, the Earth being suddenly heated by the Sun's fiercer Beams, the Roots are rather scorched and dried up in the Earth, than nourish'd; so that the Plant consisting only of watry parts, is consumed, as it were, by Fire: sometimes hopeful Plants, when by a sudden Gust some Master Veins are broken, if sudden heat ensues, they likewise Fire: for being not come to maturity, and being deprived of the Supports of Life and Vegetation, they likewise perish, are dried up, and fall to dust. *French-men* they call those Plants, whose Leaves do not spread and grow large, but rather spire upwards, and grow tall; these Plants they do not tend, being not worthy their Labour. Were they so Critical, I believe, they might have great Guess what Plants were most likely to turn *French-men*, by observing whether the Roots of the Plants run downwards, as those whose Branches are aptest to spire upwards: for tho' I have not made positive proof thereof, I have something more than bare fancy for my conjecture; I have pull'd up some of these *French-men*, and compar'd them with the Roots of some other Plants, and found them much longer than others; and 'tis observable, loose Soyls, and sandy Ground, are more subject thereto than the stiff Land. The Country of itself is one entire Wood, consisting of large Timber Trees of several sorts, free from Thickets or under Wood, the small Shrubs growing only on Lands, that have been clear'd, or in Swamps; and thus it is for several Hundreds of Miles, even as far as has yet been discover'd. But that shall be reserv'd till another opportunity.

I am, &c.

III. *An*